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TI - Development of the wafer level compressive-flow ---underfill--- process and its required materials
IN - Shi, S. H.; Yamashita, T.; Wong, C. P.
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AB - This paper described a wafer-level compressive flow ---underfill--- process and its involved materials for a novel SMT transparent flip-chip technol. In this flip-chip technol., a liq. ---fluxable--- wafer level compressive flow ---underfill--- (WLCFU) material is coated on the active side of an entire patterned and bumped wafer at 1st. The WLC

FU

layer is dried up at an elevated temp. to form a solid layer. The coate

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bumped wafer is then diced into individual chips. The diced individual chips are then placed on to a carrier film with their active side to the tacky side of the carrier film. These diced individual chips are picked from the tacky carrier film and placed on a substrate such as a PWB boar

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using std. SMT equipment. At an elevated temp. (100-180.degree.) during solder reflow, the solid WLCFU layer can be re-melted and easily fill in the gaps between chip and substrate. After solder reflow (190-200.degree.), the WLCFU material can be fully cured. A B-
---stage--- epoxy technol. was used to develop this WLCFU material and the tacky material on the carrier film. A properly selected ---fluxing--- agent was added to both the WLCFU and tacky materials to provide sufficient ---fluxing--- capability for good solder interconnection. Thermo-gravimetrical analyzer (TGA) was used to study the drying kinetics and material wt. loss during reflow process. Differential Scanning Calorimetry (DSC) was used to study the curing kinetics of the prepd. formulations. Thermo-Mech. Analyzer (TMA) was us

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to study the heat distortion temp. (TMA TG) and the coeff. of thermal expansion (CTE). Dynamic-Mech. Analyzer (DMA) was used to measure the storage modulus (E') and crosslinking d. (.rho.) of the cured material. Rheometer was used to study viscosity (.eta.) change with the temp. increase during solder reflow process. Preliminary results demonstrated the feasibility of the proposed novel flip-chip technol. with the developed WLCFU and tacky materials. The basic qualifications of the WLCFU material were examd. Some tech. barriers related to this technol. are also discussed.

ST - epoxy resin ---underfill--- flip chip packaging
IT - Crosslinking
Electronic packaging materials
Electronic packaging process
Fillers
(development of wafer level compressive-flow ---underfill--- process and required materials)
IT - Epoxy resins, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)